



# ICAR-CIAE NEWSLETTER



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## FROM THE DIRECTOR'S DESK



Natural farming, a sustainable agricultural practice that discourages chemical fertilizers and pesticides, has gained significant traction in recent years. While this approach offers numerous environmental and health benefits, it often requires intensive labour, which can be a major challenge for farmers, especially in the context of declining rural workforce. This is where mechanization can play a crucial role in making natural farming more efficient, profitable, and scalable. By automating tasks like land preparation, sowing, weeding, and harvesting, mechanization can significantly reduce the labour input required for natural farming. This not only reduces the drudgery associated with these tasks but also frees up farmers' time to focus on other aspects of their farming operations. Additionally, mechanization can improve the precision and efficiency of various agricultural operations, leading to higher yields and better quality produce.

However, it is essential to ensure that the mechanization process is aligned with the principles of natural farming. The use of heavy machinery can damage soil structure and disrupt the delicate ecological balance. Therefore, it is crucial to develop and adopt sustainable mechanization practices that minimize soil disturbance and promote bio-diversity. The government and agricultural research institutions can play a pivotal role in promoting mechanization in natural farming. Research and development efforts should focus on developing innovative, eco-friendly machinery that is suitable for small and marginal farmers.

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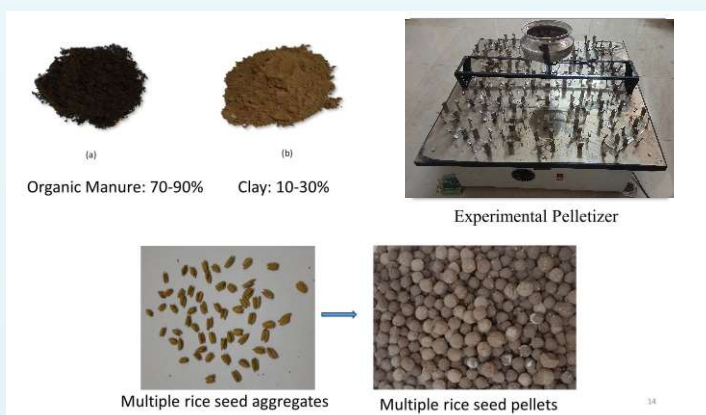
While ICAR-CIAE primarily focuses on mechanization in agriculture, its research and development efforts indirectly contribute to natural farming. By developing energy-efficient machinery, promoting renewable energy solutions, and focusing on post-harvest technologies, the institute supports sustainable agricultural practices. Additionally, through training programs and knowledge dissemination, ICAR-CIAE empowers farmers to adopt eco-friendly methods and reduce their reliance on chemical inputs. Some worth mentioning developments in this period are image based nitrogen applicator, catalyst for hydrogen generation from methane, machine for tender jackfruit powder production, etc are presented in this issue of CIAE Newsletter. I feel happy to share this issue of CIAE Newsletter which particularly focuses on energy and food processing related technologies.

**RESEARCH & DEVELOPMENT**
**Image based variable-rate nitrogen applicator for field crops**

This equipment was developed to address site-specific nitrogen requirements in crops. The unit uses a digital imaging system and a camera to assess crop nitrogen stress non-destructively, which is then processed by an AlexNet deep learning model. This model is developed in a Raspberry Pi microcontroller, which controls a proportional flow control valve to adjust fertilizer rates (Low, Medium, and High) based on stress levels. The system was operated at 2.0 km/h in paddy fields and uses four hollow cone nozzles to spray fertilizer uniformly. NDVI values were recorded before and after urea applications, showing significant improvements: a 72.4% increase after the second application and a 94.2% increase after the third. This embedded system offers a promising solution for precision nitrogen application in field crops.


**Technology for direct sowing of rice seed pellets**

CAU, Gangtok centre of AICRP on FIM has developed the technology of preparing and sowing of the rice seed pellet in the field for proper germination. For production of multiple rice seed pellets, binding material such as organic manure and bentonite clay were used. The pellet mixture was made with 23% clay and 77% organic manure. Pellets have sphericity of 0.971, specific gravity of 1.45, breaking strength of 98.42 N and mean



germination time of 12 days. The pelleting unit takes 3.55 min/batch with an efficiency of 98.92%. From the field trials of multiple rice seed pellets in puddled soil using a manual planter, average hill spacing, hill population and hill spacing uniformity were observed to be 174 mm, 3 and 80.22%, respectively as against 98 mm, 6 numbers, and 63.63% respectively in case of the direct seeding by drum seeder.

**Novel Ni Catalyst Supported on Alumina and Sawdust Char for Enhanced Methane Pyrolysis to Hydrogen**

This research investigated the development and application of a novel Ni catalyst supported on alumina and sawdust char for the efficient conversion of methane to hydrogen via methane pyrolysis. The catalytic performance of the Ni/alumina-sawdust char catalyst was evaluated in a fixed-bed reactor under various operating conditions. The catalyst exhibited a methane conversion up to 98% for a period of 15 min and thereafter it sustained for 2 hours with a conversion of 60%. The high catalytic activity and stability of the catalyst can be attributed to several factors, including strong metal-support interaction between Ni nanoparticles and the alumina-sawdust char support. The porous structure of the support provides a large surface area for the adsorption and activation of methane molecules. This research demonstrates the potential of the alumina-sawdust char-supported Ni catalyst as a promising material for the efficient and sustainable production of hydrogen from methane pyrolysis.





RESEARCH & DEVELOPMENT

**Bio-insulating materials as a roof sheet in poultry housing**

Bio-composite materials were tested for the construction of insulated poultry housing. For preparing the different composite materials; four components [polyester resin (84-90%), banana and coir fiber (3-9%), hardener MEKP (5%), and silica (7%)] were used in varying proportions. The morphological images indicated good adhesion between matrix and alkaline-treated fibers, exhibiting strong adhesion strength. The ultimate strength corresponding to a higher strain rate was observed for bamboo fibre-reinforced polyester matrix composites, and also the incremental increase in strain rate was observed as fibre loading increased from 3 to 9 wt. percent.



**Self-propelled litter raker for deep litter poultry housing**

The UAS Raichur center of AICRP on UAE has developed a poultry litter raker machine for deep litter poultry systems. The machine features a blade assembly equipped with rubber batons. Additional components like the motor, protective assembly, handle, and ground wheels were integrated into the design. Trials of the developed litter raker were conducted in poultry farms



located in Mustoor and Beejinagere villages of Raichur district. The machine demonstrated superior performance at a 21% litter moisture level and an operating speed of 2 km/h, particularly when using L-type blades. However, a limitation was identified as the machine's height hindered the efficient raking of litter.

**Solar refrigerator with ice bank**

The solar refrigerator, equipped with a thermal backup system, has a storage chamber capacity of 100 liters. During testing, the compressor exhibited an average power consumption of 237.5 W and successfully charged 70 liters of eutectic solution (composed of 92.5% RO water and 7.5% ethylene glycol) within 26 hours. A load test was conducted using 15 kg of raw bananas, and the storage chamber temperature was maintained below 5°C for 5 days without the need for compressor operation, solely relying on the thermal backup system.



**Shredding machine for tender jackfruit powder production**

Tender jackfruit powder offers numerous applications, including fortification in roti, bread, and other bakery products. The production process involves peeling, cutting, shredding, drying, and grinding the tender jackfruit. A shredding machine has been developed to efficiently shred the peeled and cut jackfruit. The machine's design incorporates a specialized shredding disc that effectively processes the jackfruit without damaging the



**RESEARCH & DEVELOPMENT**

fibers. A collection disc is positioned below the shredding disc to collect the shredded material and direct it to the outlet. The machine operates using a 1 hp single-phase electric motor and has a capacity of processing 100 kg of jackfruit per hour.

**Millet based biscuit**

Millet jaggery-based biscuits have been developed to leverage the nutritional benefits of millets and promote its consumption. The biscuits are developed with ingredients such as whole-wheat flour, pear millet, foxtail millet, jaggery and skim milk powder and ghee. The proximate analysis of millet based biscuit revealed moisture content of  $3.98 \pm 0.12\%$ , protein content of  $10.21 \pm 0.34$ ; fat content of  $20.56 \pm 1.32\%$ ; total ash of  $1.65 \pm 0.11\%$  and carbohydrate content of  $64 \pm 1.57\%$ . In terms of texture analysis, hardness of biscuit was  $50.97 \pm 8.16$  N. The sensory evaluation of millet-based biscuits indicates good acceptability. The cost of production of developed millet based biscuit is Rs.210/kg.


**Technology for production of fresh gluten, gluten flour and gluten free flour**

A helical screw gluten extractor was employed to extract gluten from 30 kg of wheat flour. This process yielded 8 kg of wet gluten in 22 min, with the machine operating at 50 rpm and an initial water addition of 17 liters. After a soaking period, the gluten was separated



through a washing process involving the addition of 40 liters of water. The extracted gluten was subsequently dried at  $60^\circ\text{C}$  for 30 hours and ground to produce 3.25 kg of gluten powder. The starchy water, collected and dried under the same conditions, resulted in 25 kg of gluten-free flour.

**Nutri-dalia**

A fermented dalia, incorporating sorghum flour and a spice mix of dried vegetables (capsicum, tomato, green coriander) and seasonings (cumin, turmeric powder, salt, and herbal mixtures), has been developed. This product provides 340 kCal per 100g, with a composition of 70-75% carbohydrates, 8-10% protein, 2-4% fat, and 40 mg calcium. Fermentation



enhances the product's nutritional profile by improving protein digestibility, increasing B-vitamin content, and reducing anti-nutrients like phytates. Shelf-life studies using metallic packaging for 40 days have shown no significant deterioration in sensory attributes, texture, or moisture content. The total titratable acidity (TTA) remained stable during this period, indicating maintained quality and freshness.

**New External Funded Project**

SL. No.	Project Title	Funding Agency	Funding Amount (Rs. Lakh)
1	Assessment of farm mechanization status and custom hiring in India	DA&FW, Ministry of Agriculture, Govt. of India	434.16

**New Centre of AICRP on MAH**

A new centre of All India Coordinated Research Project on Mechanization of Animal Husbandry (Formerly UAE) at ICAR-NDRI Karnal was opened on July 1st, 2024, replacing the ICAR-NRC Equines, Hisar, Haryana center, which was recently closed on 30 June, 2024.



SUCCESS STORY/ RESEARCH & DEVELOPMENT

Success Story

Custom Hiring Center Establishment at Rajgarh district

The custom hiring centre (CHC) of agricultural machinery was established at Mau village, Sarangpur block, Dist. Rajgarh, in the year 2024. This custom hiring centre is owned and operated by Mr. Shyam Singh Rajput, a youth farmer who has a Master's degree in Agriculture Sciences. To establish the CHC, a total capital investment of ₹25 lakh was required. This amount was covered by a ₹10 lakh subsidy from the Madhya Pradesh state government and a down payment of ₹6.50 lakh from the owner, and the remaining balance was financed through a bank loan at a 9% interest rate with a repayment period of seven years. Further, CHC owner undergone training at ICAR-Central Institute of Agricultural Engineering, Bhopal, on "Operation and maintenance of custom hiring centres" of one week duration. At present, the CHC serves more than 100 farmers from different villages in the cluster, covering more than a total area of 100 ha. The CHC now houses a variety of agricultural machinery, including a 50-hp tractor, cultivator, trolley, 9-row seed-cum-fertilizer drill, rotavator, 2-bottom reversible MB plough, drone, multi-crop thresher, straw reaper combine, and spiral grader. The CHC rents out various implements, such as cultivator, rotavator, plough, seed drill, thresher, and reaper. The CHC is providing a good opportunity to local youth by employing them as full-time tractor operators at a good remuneration. The established CHC generated very handsome profit in this year which proved this to be successful model.



Technologies released on 96th ICAR Foundation Day (16 July, 2024)



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

**Dr. Dilip Jat**  
(Lead Developer)

Associate Developer  
**Dr. Syed Imran S.**

of

ICAR-Central Institute of Agricultural Engineering  
Bhopal

has developed the technology

**Tractor drawn garlic dibbler  
for raised beds**

16th July, 2024  
New Delhi

(K. Narsalah)  
Assistant Director General (PE)

(S.N. Jha)  
Deputy Director General (Agril. Engg.)



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

**Dr. Manoj Kumar**  
(Lead Developer)

Associate Developer  
**Er. Sweeti Kumari**

of

ICAR-Central Institute of Agricultural Engineering  
Bhopal

has developed the technology

**Bunch field crop harvester**

16th July, 2024  
New Delhi

(K. Narsalah)  
Assistant Director General (PE)

(S.N. Jha)  
Deputy Director General (Agril. Engg.)



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

**Dr. T. Senthilkumar**  
(Lead Developer)

Associate Developers  
**Dr. Syed Imran S., Dr. T. Arumuganathan  
Dr. C. Sankaranarayanan**

of

ICAR-Central Institute of Agricultural Engineering  
Bhopal

has developed the technology

**ICAR CIAE-SBI small tractor  
operated EPN applicator for sugarcane  
white grub management**

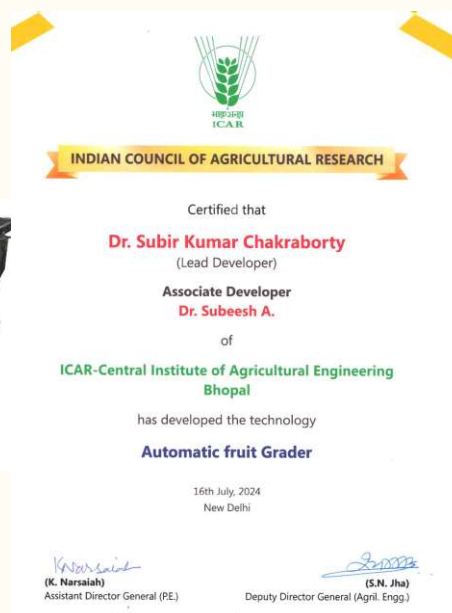
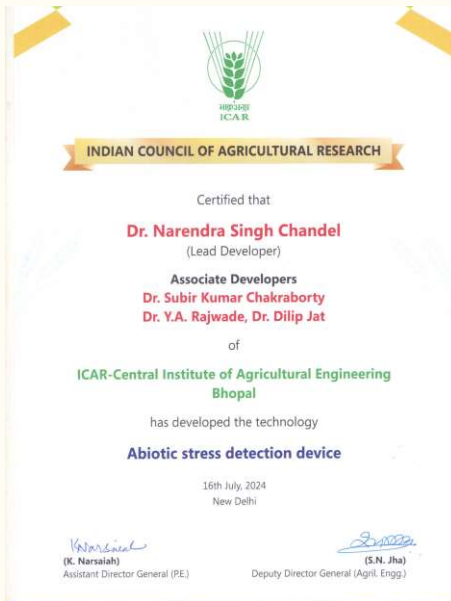
16th July, 2024  
New Delhi

(K. Narsalah)  
Assistant Director General (PE)

(S.N. Jha)  
Deputy Director General (Agril. Engg.)

RESEARCH & DEVELOPMENT

Technologies released on 96th ICAR Foundation Day (16 July, 2024)





## TRAINING

### Hands on training on Soymilk and Tofu under ABI-NAIF

Two hands-on training programs on Soymilk and Tofu production for the incubates of the NAIF-ABI program was organized during 22 July, 2024 and 6-8 August, 2024, with the participation of 12 trainees from Madhya Pradesh. The training primarily focused on providing hands-on experience in soy milk and tofu production to the trainees enrolled under the NAIF-ABI program at ICAR-CIAE, Bhopal.



### Soy-food Training programme for Upcoming Entrepreneurs

An entrepreneurship development program on "Soy-Milk, Tofu & Soy-based Confectionary Products" was conducted during 9-13 September, 2024. Eight trainees from Maharashtra, Gujarat, Haryana, Punjab, Uttarakhand and Manipur participated. The training module primarily consisted of practical demonstrations and hands-on training supported by theoretical aspects. The training covered various topics, including soy-based food products, soymilk and tofu preparation, soy processing equipment, project planning, storage and packaging, quality standards, and the marketing of soy products.



### Training organized by Regional Station, Coimbatore

Regional Station, Coimbatore organized Training cum demonstration of developed technologies for officials of Agricultural Engineering Department, Tamil Nadu Government and farmers on 15 July, 2024. Twenty officials from Agricultural Engineering Department, Govt. of Tamil Nadu and more than forty farmers from Coimbatore district participated. During the demonstration, equipment and technology developed by the station were demonstrated.



### Internship training programme for Students

Internship training programme for B.Tech. (Agricultural Engineering) students was organized at ICAR-CIAE Bhopal and at Regional Station, Coimbatore for one to two months duration. Total 48 students from CAET, CAU, Samastipura (Bihar); CAET, PDKV, Akola (Maharashtra), CAET, Dapoli (Maharashtra); CAET, Parbhani (Maharashtra); AEC&RI, Kumulur (Tamil Nadu); CAE, Madakasira (Andhra Pradesh) and from Dr. NTR College of Agricultural Engineering, Bapatla (Andhra Pradesh) attended the training. During the training period, field visits to local agricultural machinery manufacturing industries were also arranged for practical exposure to improve their knowledge of manufacturing, production and marketing of agricultural machinery.

### Programmes under SCSP Scheme

Under the SCSP scheme, a programme on "Demonstration cum distribution of Agricultural Engineering tools/equipment to SC-BPL beneficiaries" was organized at selected villages of Datia district during 7-8 August, 2024. Total 198 SC-BPL beneficiaries participated in the programme and total 974 number of agricultural engineering tools/equipment were distributed to the benefi-

## TRAINING/ TECHNOLOGY TRANSFER

ciaries under direct benefit transfer. The distributed tools/ equipment includes Spiral grader (42), Groundnut decorticator (40), Maize sheller (356), Cooking stove (178), Grubber weeder (178), Dry land weeder (50), Twin wheel hoe (50), Hand ridger (50), Stalk uprooter (25), and Cycle hoe (25). All these tools/equipment were demonstrated to the beneficiaries and information about its adjustment, operating parameters, maintenance etc. was provided.



Training programs for rural beneficiaries were also organized during 5-7 September, 2024 and 11-13 September, 2024. This program focused on advanced agricultural engineering for high productivity and entrepreneurship development. In the first training participants of the program were from the village of Bagonia in Bhopal district (140 rural individuals). In the second training, participants were from the villages of Tarasevaniya and Prithvipura in Bhopal district (117 rural individuals). The trainees were given training in various areas of agricultural engineering, such as agricultural machinery and its maintenance, agricultural products and processing, agricultural energy, as well as the importance of micro-irrigation and water management.

### Training organized under DBT Kisan Hub (Phase-II)

An online training program was organized on 13 August, 2024 under DBT Kisan Hub (Phase-II), focusing on



"Entrepreneurship Development Among Rural Youths for Establishing Custom Hiring Centres (CHC) for Agricultural Machinery." Participants were introduced to the potential benefits and opportunities of establishing CHCs at the village level. The session covered various government schemes, both state and central, that provide financial support for these initiatives.

### Demonstration at Farmers' field

Sl. No.	Technologies demonstrated	Village(s)	No. of farmers participated	Area (ha)
1	Drone for spraying in soybean crop	Chainpura, Bhopal	47	0.4
2	Tractor drawn slit till drill	Rasla khedi, Kham kheda and Karond khurd, Bhopal	09	9.0

### Participation in Exhibitions

Sl. No.	Exhibition	Date	Place
1	Agri Intex	11-15 July, 2024	CODDISIA, Coimbatore
2	Kisan Mela	21 August, 2024	ICAR NRC Banana, Trichy
3	TNAU State level Mega Farmer's Day	26-29 September, 2024	TNAU Coimbatore

### Design registration granted

Sl. No.	Design Item	Design Registration No/ Date	Inventors
1	Raceway pond for culturing microalgae	420511-001 31 July, 2024	Dr. Anil K. Dubey Dr. Ankur Nagori Er. Swapnaja Jadhav Dr. Sandip Gangil Dr. Parmanand Sahu Dr. Mayuri Gupta

### Media Activities

Speaker	Topic	Media	Date
Dilip Jat Scientist	फसलों की कटाई एवं गृहाई हेतु उन्नत कृषि यंत्र	All India Radio, Bhopal	25 September, 2024
MPSingh, ACTO	Techniques related to Kharif crops	Doordarshan Kendra, Bhopal	8 August 2024



**KVK NEWS**
**Training Programme Organized by KVK**

SL. No.	Title of the training	Date	No. Participants
1.	'Weed Management in Major Kharif crops' at Raipur village	11 July, 2024	14
2.	'Post-Harvest Management and Value Addition of Kharif Crop: Soybean' under Viksit Bharat was conducted at KVK, Bhopal and Government Higher Secondary School, Gunga, Bhopal	23-25 July, 2024	69
3.	'Jal Shakti Abhiyan-Catch the Rain' initiative for the employees of NGO - Action for Social Advancement	13 August, 2024	27
4.	'Jal Shakti Abhiyan- Catch the Rain' initiative for the farmers from Pipaliya, Pradippura and Tara Sevaniya villages	12 September, 2024	65
5.	Orientation-cum-training program under 'Rural Agriculture Work Experience (RAWEE)' for final-year B.Sc. Agriculture students from Ravindra Nath Tagore University, Bhopal	21-28 August, 2024	48
6.	'Integrated Farming Systems and Nutrient Management' under Viksit Bharat at Raipur village, Bhopal	29 August, 2024 to 4 September, 2024	95
7.	Farmers' Training Program on 'Uses and Importance of Agricultural Equipment' sponsored by ATMA, Darbhanga, Bihar	10-14 September, 2024	20
8.	Orientation-cum-training program under 'Rural Agriculture Work Experience (RAWEE)' for final-year B.Sc. Agriculture students from School of Agriculture at LNCT University, Bhopal	17-21 September, 2024	51
9.	Farmers' Training Program on 'Maintenance and Repair of Agricultural Equipment,' sponsored by ATMA, Begusarai, Bihar	23-27 September, 2024	25


**Exposure Visit in KVK**

SL. No.	Institution organised	Place	Date	Participants
1.	ATMA Shivpuri	KVK, Bhopal	30.07.2024	57
2.	NGO: Action for Social Advancement	KVK, Bhopal	13.08.2024	27

## KVK NEWS

### Advisories for Farmers

Sl. No.	Programme	Date	Village / Location
1.	Advisory on Kharif crops	09.07.2024	Gondermau
2.	Advisory on Kharif crops	04.07.2024	Kachhi Barkheda
3.	Advisories on disease prevention in spinach leaves and purple blotch in onion	25.07.2024	Golkhedi
4.	Advisory on organic practices related to crop cultivation and adoption of integrated farming	25.07.2024	Vat Savitri Jaivik Farmer Producer Company Ltd. Bhopal
5.	Management of milch cattle during monsoon season	25.07.2024	Golkhedi
6.	Advisory in the domain of natural farming	13.08.2024	Chandpur

### Other Events organized by KVK

Event	Date	Venue
DA&FW, Gol conducted the survey programme on emission norms of various agriculture machinery in collaborations with the Tractor Association of India, New Delhi	06.08.2024	KVK, ICAR -CIAE, Bhopal
Plant for Mother campaign	13.08.2024	Chandpur village
Tree Plantation drive	25.07.2024	Government Higher Secondary School, Gunga
19 <sup>th</sup> Parthenium Awareness Week	16.08.2024 to 22.08.2024	KVK, ICAR -CIAE, Bhopal
Plant for Mother campaign	29.08.2024	Raipur village
Swachhta Hi Seva campaign	17.09.2024 to 02.10.2024	KVK, ICAR -CIAE, Bhopal





**EXTENSION ACTIVITIES**
**MoU/ MoA Signed**

Sl. No.	Institution	Purpose	Date
1	Mechanization and Technology Division, Department of Agriculture & Farmer's Welfare, Govt. of India, New Delhi	Study on Assessment of status of a farm mechanization and custom hiring in India	5 July, 2024
2	IIPR-Regional Station, Bhopal	Production of breeder seed of pulses and sharing of revenue @50% on sale of processed breeder seed	5 August, 2024
3	Melseemai Pazhangud iyinar Farmer Producer Company Ltd., Hasanur, Erode district, Tamil Nadu	Establishment of Millet Processing Centre under the Tribal Sub -Plan (TSP) for a period of three years at Hasanur, Erode District, Tamil Nadu	14 August, 2024
4	National Institute of Food Technology, Entrepreneurship and Management, Thanjavur (NIFTEM -T) Tamil Nadu	Cooperation on Agricultural processing/ food sector and concerning personal exchange.	12 September, 2024


**Test Reports of Commercial Machinery**

	No. of Test Reports Released	Revenue Generated, Rs in lakh
Farm machinery	32	101.52
Post-harvest machinery	34	28.84

**AWARDS & RECOGNITION**

Sl. No.	Scientist	Award/ Recognition	Awarding Society/ Institute
1.	Dr Shiv Pratap Singh, Project Coordinator, AICRP on Mechanization of Animal Husbandry (formerly UAE)	Sugar Industry Excellence Award -2024 for outstanding contribution in Agricultural Mechanization and Technology in International Sugar Conference on 'Building a Resilient and Sustainable Global Sugar & Bio -energy: Transforming ASEAN Sugar Sector'	International Centre for Interdisciplinary Science & Education, Quy Nhon, Vietnam
2.	Dr. Manish Kumar	Certificate of Excellence in Reviewing	Journal of Experimental Agriculture International
3.	Dr. Ramesh Kumar	Associate Editor (Farm Machinery and Power Division)	Journal of Agricultural Engineering (India)[JAEI]
4.	Dr. Abhijit Khadatkar	Second Prize in oral presentation during National Hindi Scientific Seminar-2024 at ICAR-NINFET, Kolkata on September 26, 2024	ICAR-NINFET, Kolkata
5.	Dr. Sweeti Kumari	Consolation Prize in oral presentation during National Hindi Scientific Seminar-2024 at ICAR-NINFET, Kolkata on September 26, 2024	ICAR-NINFET, Kolkata
6.	Dr. Sweeti Kumari	Second prize in Debate competition during Hindi Pakwada Week	ICAR-CCARI, Goa
7.	Dr. Dilip Jat	Best technology certificate during 96th ICAR Foundation day at New Delhi	ICAR, New Delhi
8.	Dr. Adinath Kate	Working Committee member of NAAS -YUVA, a new initiative of National Academy of Agricultural Science for "Youth United for Visionary Agriculture"	NAAS, New Delhi
9.	Dr Mukesh Kumar	Best oral presentation award in an International Conference on "Agrovoltaics and Sustainability in Farming" organized by Tamil Nadu Agricultural University, Coimbatore on 19 September, 2024 for paper titled "Solar - powered IoT -enabled floating pump for small farms"	TNAU, Coimbatore
10.	Dr Syed Imran and team	Best oral presentation award in International Conference on Impact of climate change on biodiversity - A global perspective at TANUVAS, Chennai during 11-13 July, 2024	TANUVAS, Chennai
11.	ICAR CIAE Regional Station Coimbatore	Technical Excellence Award" – for the year 2024. The award was presented during Annual Convention of The Deccan Sugar Technologist's Association (India), Pune, India held at Pune, Maharashtra on 24th of August 2024	The Deccan Sugar Technologist's Association (India), Pune, India.
12.	Malathi, Ravindra Naik et al.	Best Technical Paper Award for the paper entitled 'Mechanized priming of Sugarcane planting material – An efficient and economical way of delivering agro inputs for healthy Nursery and Main field crops'.	The South Indian Sugarcane and Sugar Technologist Association



**HRD**
**Foreign Deputations**

Dr Samlesh Kumari, Scientist availed training as a Researcher at University of Guelph, Canada during 11 July to 25 August, 2024.



Dr. KN Agrawal, Project Coordinator, AICRP on FIM and Dr SP Singh, Project Coordinator, AICRP on MAH visited Quynohn, Vietnam to participate in the 8<sup>th</sup> IAPSIT International Sugar Conference and Sugarcon 2024 organized during 16-19 September, 2024. The conference was jointly organized by International Association of Professionals in Sugar and Integrated Technologies (IAPSIT), China, Society for Sugarcane Research & Promotion, New Delhi, India and The Sugar Technologists' Association of India, New Delhi, India. The conference was organized at International Centre for Interdisciplinary Science and Education, Quy Nhon, Vietnam. About 250 participants from China, India, USA, Germany, Cambodia, Vietnam, Fiji, Thailand, Philippines, and Korea attended the Conference.

**Human Resource Development**

Scientist	Course Title	Duration	Venue/ Place
Dr. Shashi Rawat	ChatGPT and generative tools for Government officials (online)	15 July, 2024	Online (organized by DoPT)
Dr. KVR Rao	Skill upgradation organized for sectional committee members	22 July, 2024	BIS, New Delhi
Dr. Shashi Raw at	Training on Prevention of sexual harassment of women at workplace by ISTM (online)	29 July, 2024	Online (organized by DoPT)
Dr. Harsha Wakudkar	Two week online workshop on Material characterization and data analysis	2-22 September, 2024	SIAS Research Centre, Kohinoor, Kerala (Virtual mode)
Dr. Sweeti Kumari	Faculty Development Programme (online)	10-30 September, 2024	National Agricultural Development Cooperative Ltd. (NADCL), Baramulla
Dr. Ravindra Randhe	Mushroom cultivation training program	23-28 September, 2024	ICAR-DMR, Solan


**Ph.D. Awarded**

Er HS Pandey, Scientist was awarded Ph.D. for his thesis titled 'Development and Performance Evaluation of a Battery-Powered Weeder'. He did his Ph.D. from College of Technology and Engineering, Maharana Pratap University of Agriculture & Technology, Udaipur under the guidance of Dr. GS Tiwari, Retired Professor, CTE, MPUAT, Udaipur.

## PUBLICATIONS

### Book Chapters

Dixit PS, Sahni RK, Shukl KS, Mishra DB and Singh R, 2024. Precision agriculture technologies for a sustainable future. Farming the Future: Advanced Techniques in Modern Agriculture Volume I (ISBN: 978-93-95847-45-2), Bhumi publishing, Kolhapur, Maharashtra, India, pp. 70-81.

Hasan, M., Maheshwari, C., Meena, N. L., Garg, N. K., Tripathi, K., & Ahmad, D. (2025). Health Benefits and Medicinal Properties of Oats: Molecular Mechanisms and Disease Management. In: Oat (*Avena sativa*) production to plate. CRC Press. ISBN:978-1-032-19928-3.

Mahapatra, J., Sahni, R.K., Sahoo, P.K., Shrinivasa, D.J. (2024). IoT-Based Real-Time Farm Management System for Smart Agriculture. In: Chouhan, S.S., Saxena, A., Singh, U.P., Jain, S. (eds) Artificial Intelligence Techniques in Smart Agriculture. Springer, Singapore. [https://doi.org/10.1007/978-981-97-5878-4\\_16](https://doi.org/10.1007/978-981-97-5878-4_16).

Maheshwari, C., Hasan, M., Kumari, A., Prathap, V., Lekhak, B., Garg, N. K., ... & Singh, I. Biotechnological, Molecular, and Processing Strategies for Improving Nutritional and Functional Properties of Oats. In Oat (*Avena sativa*) production to plate. CRC Press. ISBN: 978-1-032-19928-3.

Meena, N. L., Kumari, A., Maheshwari, C., Bhardwaj, R., Dhaka, A. S., & Hasan, M. (2024). Antioxidant Defense Mechanism and High-Temperature Stress Tolerance in Plants. In: In Molecular Dynamics of Plant Stress and its Management. Springer Nature. ISBN: 978-981-97-1698-2.

Pravitha, M., and Ajesh Kumar, V. (2024). Coconut Kernel and Coconut Milk Preservation-Recent Technologies and Prospects. In: Preservation and Authentication of Coconut Products. Springer, Cham. ISBN: 978-3-031-64652-2.

Mishra, N., Sahni, R.K. (2024). Introduction to Artificial Intelligence Techniques in Agricultural Applications and Their Future Aspects. In: Chouhan, S.S., Saxena, A., Singh, U.P., Jain, S. (eds) Artificial Intelligence Techniques in Smart Agriculture. Springer, Singapore. [https://doi.org/10.1007/978-981-97-5878-4\\_3](https://doi.org/10.1007/978-981-97-5878-4_3).

Nisha Sulakhe, Shilpa S Selvan, Sumit Urhe, Naveen Jose, Rajasekhar Mathangi, Abhinav Dubey, Srikrishna Nishani, Pramod Shelake, Ravindra Naik, Debabandya Mohapatra, GRK Murthy, N Srinivasa Rao and VV Sumanth Kumar.

Emerging Technologies for Food Processing. In: Research and Technological Advancement in Agriculture. Eds: Srinivasa Rao, Ch., Dhandapani A and Sanjiv Kumar. ISBN: 978-93-340-3808-6.

Rahul Kumar Rout, Ritu Bharat Kukde, Pakkiranna Sivamma, Ravi Prakash, Ankit Kumar, Sourav Misra, P Srinivasa Rao, Ravindra Naik, Rekha Menon Ravindra, GRK Murthy, NAV Avinashilingam, BS Yashavanth and Ch Srinivasa Rao. Role of Agro-Processing towards Climate Resilience in Agriculture. In: Research and Technological Advances for Resilient Agriculture. Eds: Srinivasa Rao, Ch., Vijay Avinashilingam, N. A., and Yashavanth, B. S. ICAR-National Academy of Agricultural Research Management, Hyderabad, India. ISBN: 978-93-340-3914-6.

### Papers published in Referred journals

Badegaonkar, U.R., Kumar, Manish., Kamble, A.K. and Thakare, S.H., 2024. Optimization of Design Parameters of Press Wheel Attached Straw Cutting Mechanism for Rice Residue in Simulated Field Condition: Straw Cutting Mechanism using Press Wheel Attached for Rice Residue. Journal of Scientific & Industrial Research (JSIR), 83(9), pp.1033-1041.

Hamad, R., Chakraborty, S.K. & Ajesh Kumar, V. Estimating the changes in mechanically expressible oil in terms of content and quality from ohmic heat treated mustard (*Brassica juncea*) seeds by Vis-NIR-SWIR hyperspectral imaging. Journal of Food Measurement and Characterization. <https://doi.org/10.1007/s11694-024-02867-2>.

Jiang, L., Jiang, H., Jing, X., Dang, H., Li, R., Chen, J., Majeed, Y., Sahni, RK. and Fu, L., 2024. UAV-based field watermelon detection and counting using YOLOv8s with image panorama stitching and overlap partitioning. Artificial Intelligence in Agriculture. 13, 2024, 117-127.

Nalawade RD, Singh KP, Roul AK, Agrawal KN, Sonawane S, and A Mahore, 2024. Study on the effect of geometrical and operational parameters on performance dynamics of modified rotary blades using DEM. Scientific Reports. 14((1): 19239.

Radhakrishnana NS, Singh SP, Kushwaha HL, Kumar Adarsh, Sarkar Susheel Kumar and Shekhawat Kapila. 2024. Innovative fabrication methods for agricultural equipment: The case of a 3-D printed paddy drum



## PUBLICATIONS/ EVENTS

seeder-cum-fertilizer applicator. *Indian Journal of Engineering and Materials Sciences*. 31 (3): 416-424.

Sharma, R. K., Haydary, J., Singh, T. P., Nazari, M. A., Mandal, S., & Verma, A. (2024). Fractional distillation of pine needle bio-oil: comprehensive characterization and rheological properties across temperature gradients. *Biomass Conversion and Biorefinery*, 1-12. <https://doi.org/10.1007/s13399-024-06044-9>.

Thorat, D., Mehta, C. R., Agrawal, K. N., Jyoti, B., Kumar, M., & Chandel, N. S. (2024). Performance Evaluation of Variable Rate Spraying System under Simulated Conditions. *Journal of Agricultural Engineering (India)*, 61(2), 133-146.

Vinod Kumar S, Singh CD, Rao KVR, Rajwade YA, Kumar Mukesh, Jawaharlal D, Asha KR. 2024. IoT-based smart drip irrigation scheduling and wireless monitoring of microclimate in sweet corn crop under plastic mulching. *Irrigation Science*. <https://doi.org/10.1007/s00271-024-00945-3>.

Waghmare, R., Kumar, M., Zhang, B., Yadav, R., Dukare, A., Radha, Chandran, D., Nayi, P., Hasan, M., Dhumal, S., Dharmarao, T., Malik, T., Sarma, R. Pulsed Light: Innovative Non-Thermal Technology for Preservation of Fruits and Vegetables. *Food Physics*, (2024). doi:<https://doi.org/10.1016/j.foodp.2024.100022>.

**Popular Articles**

Abhishek Waghaye, Mukesh Kumar, R.K. Singh, Ravindra Randhe, C.K. Saxena, Deepika Yadav and Raman Kumar Maurya. 2024. भिंडी की फसल में जल प्रबंधन एवं अच्छी पैदावार के लिए सुझाव. *Krishak Doot*. Bhopal, 24-30 September issue, Page no 7 & 13.

Bhupendra Singh Parmar, Anurag Patel and Narendra Singh Chandel (2024) Automation and robotics in agriculture: transforming the future of farming. *Science for Agriculture and Allied Sector*. Volume 6, (9).

Gautam, R, Sawant C.P., Khadatkar, A., Magar, A.P., 2024. Sanrakshit kheti ke liye unnat krishi yantra. *Kheti*, Sept. issue, 23-27.

Kumar SP, Sahni RK, Thorat DS, Kumari S and Shanishare H. *Krishi me drone ki badhati upiyogita*, *Kheti*, October 2024, 30-32.

Sharma AK and Pawar DA. 2024. बेदाना उत्पादनातील नवीन तंत्रज्ञान, द्राक्षवृत्त, महाराष्ट्र राज्य द्राक्ष बगायतदार संघ पुणे, स्मरणिका, द्राक्ष परिषद अंतर्गत वार्षिक मेलावा, page: ३६-३७.

Shukla D, Ahmad D, Khan S, and Hasan M (2024). Tofu: The Budget-Friendly Superfood for Vegetarians. *Scientific India*. Vol: 12, Issue 04. Aug. 2024.

Shukla D, Hasan M and Khan S (2024). Pectin: An Esteemed Plant-Derived Molecule in the Food Industry. *Scientific India*. Vol: 12, Issue 04. Aug. 2024.

**Secretary, DARE & DG ICAR visits Regional station Coimbatore**

Dr. Himanshu Pathak, Secretary, DARE & Director General, ICAR visited Regional Station, Coimbatore on 11 July, 2024. He was accompanied by Dr G. Hemaprabha, Director, ICAR Sugarcane Breeding Institute, Coimbatore and Dr Dinesh Singh, Project Coordinator AICRP on Sugarcane.

During the visit, equipment and technology developed by CIAE Regional Station like package of equipment for sugarcane cultivation, banana cultivation, minimal processing of banana central core, rope making from banana pseudo-stem, cassava cultivation, primary processing of Cashew apple and onion cultivation were displayed and demonstrated.

**RAC Meeting**

The 29<sup>th</sup> Research Advisory Committee meeting was held during 18-19 July, 2024 under the chairmanship of Dr DC Joshi, Former Vice Chancellor, Kota Agriculture University. Other members present during the meeting included Dr R. Manohar Jesudas, Retd. Professor and Head, AMRC, TNAU, Coimbatore; Dr Madan Kumar Jha, Professor and Head, AGFE, IIT Kharagpur; Dr Siva Reddy V (online, 19<sup>th</sup> July), Director (Tech.), National Institute of

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Solar Energy, Gurugram, Haryana; Dr Tanweer Alam, Director, Indian Institute of Packaging, New Delhi; Dr Krishna Pratap Singh, ADG (Farm Engineering), ICAR; Dr CR Mehta Director, ICAR-CIAE and Dr Subir Kumar Chakraborty, Member Secretary and PS, ICAR-CIAE. In the two-day meeting, the ongoing research programmes being conducted in the institute were reviewed by the committee and the future direction was also suggested.

### Launching Workshop cum Training of State Coordinators of project on “Assessment of Farm Mechanization Status and Prospects of Custom Hiring in India”

This Launching Workshop was held at NAAS Complex, New Delhi on August 20, 2024. Dr. Himanshu Pathak, Secretary (DARE) & DG (ICAR) chaired the session, alongside Smt. S. Rukmani, Joint Secretary, Ministry of Agriculture & Farmers Welfare as a guest of honor, Dr. S. N. Jha, DDG (Engineering), ICAR, New Delhi as a co-chairman, Dr. K.P. Singh, ADG (FE), ICAR, New Delhi, Dr. C. R. Mehta, Director, ICAR-Central Institute of Agricultural Engineering (CIAE) Bhopal. Dr. K. Narsaiah, ADG (Process Engg), ICAR, New Delhi and Project coordinators of different AICRP schemes along with SMD officials and Official of M&T, Department of Agriculture and Farmer's Welfare were also present.



The DG (ICAR) highlighted the need to conduct such study in a systematic manner and leverage digital technologies for efficient data collection and analysis. Dr. S. N. Jha underscored the importance of proper statistical considerations in the data collection process and recommended that State Coordinators directly collect 20% of the data to ensure accuracy. Smt. S. Rukmani, Joint Secretary (MA&FW) emphasized the significance of the study in shaping farm machinery schemes to enhance mechanization and improve farm power availability in under-mechanized regions. Dr. C. R. Mehta provided an overview of the project, detailing its historical background and strategic goals.

### Academia-Industry Interaction Meet at Rajkot

Interaction Meet on Agricultural Mechanization was organized at Rajkot (Gujarat) on 24 September, 2024. Agricultural machinery manufacturers from Gujarat, as well as scientists and researchers participated in the meet. This meet aimed to strengthen partnerships between academia and industry to advance agricultural and horticultural mechanization. Shri Parshottam Rupala, MP, Rajkot, inaugurated the event, emphasizing that mechanization boosts productivity and alleviates labor challenges. Shri Rajiv Chaudhary, Director, Directorate of Agricultural Engineering, Madhya Pradesh, discussed plans to include agricultural machinery in subsidy programs to benefit farmers. Dr. CR Mehta, Director, ICAR-CIAE highlighted the increasing mechanization in India, stressing the need for quality standards. CIAE technologies ready for commercialization were presented, followed by discussions on machinery standards and testing.





**EVENTS****Mahila Kisan Diwas celebration**

On the occasion of Mahila Kisan Diwas, a field day was organized at Parvalia Sadak village, Bhopal. Over 180 farmers, including 147 women, participated. Dr. Sukhbir Singh, Project Coordinator of AICRP on ESAAS, inaugurated the event. The program included live demonstrations of women-friendly agricultural technologies, covering safety practices for handling farm tools and machinery. Participants were introduced to small equipment like manual groundnut decorticators, coconut dehuskers, vegetable transplanters, dibblers, maize shellers, and protective safety gadgets for spraying. A session was also dedicated to promoting a nutritious, balanced diet for farm women's health and the establishment of kitchen gardens to encourage self-sustenance.

**Awareness workshop on Soy for Food Uses and its Role in Entrepreneurship Development**

An awareness program on "Soy for Food Uses and its Role in Entrepreneurship Development" was organized on 5 September 2024 in association with AFSTI-Bhopal Chapter. The event was attended by 30 undergraduate/postgraduate students and faculty members from the Food Technology and Nutrition Department of Government Geetanjali College and Sant Hirdaram College, Bhopal. The primary aim of the programme was to create awareness about soybeans' potential in food applications and fostering entrepreneurship in agribusiness. It



specifically encouraged the development of agribusiness ventures, helping students transform their innovative ideas into successful commercial enterprises. Followed by the lectures, participants were given a practical demonstration of the soybean processing techniques at the pilot plant level.

**Scientist-Agro Machinery Industry Meet**

Scientists – Agro-machinery Industry Meet was organized on 23 August 2024. In this event 50 participants including agricultural machinery manufacturers of Madhya Pradesh and 04 manufacturers from Punjab and Scientists / Officers from ICAR-CIAE, Bhopal participated.

**Review Meeting DBT Kisan Hub Project**

A Review Meeting with Manthan (Hub coordinator) and other partners under DBT Kisan Hub Project in eight aspirational districts of Madhya Pradesh was organized on 9 July, 2024. During the meeting, the agenda was briefed by the Hub coordinator and reviewed the progress of the current kharif season of all the partners. Each partner presented activities carried out in the last rabi and summer seasons, including the activities under progress for the current Kharif season. Also, an action plan for future activities for the ongoing kharif season was discussed by the partners.





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### हिन्दी पखवाड़ा

संस्थान में दिनांक 14 से 28 सितंबर 2024 तक हिन्दी पखवाड़ा का आयोजन किया गया। हिन्दी दिवस के अवसर पर संस्थान के निदेशक डा. सी. आर. मेहता की अध्यक्षता में हिन्दी पखवाड़ा उद्घाटन कार्यक्रम का आयोजन किया गया। हिन्दी पखवाड़े के दौरान संस्थान के वैज्ञानिकों, प्रशासन एवं वित्त से जुड़े अधिकारियों एवं कर्मचारियों, तकनीकी श्रेणी के अधिकारियों एवं कर्मचारियों, प्रोजेक्टकर्मियों, संविदाकर्मियों एवं विद्यार्थियों के लिए 8 प्रतियोगिताओं-हिन्दी रंगोली प्रतियोगिता, हिन्दी प्रश्नमंच प्रतियोगिता, हिन्दी पोस्टर प्रतियोगिता, हिन्दी गीत अन्ताक्षरी प्रतियोगिता, हिन्दी क्विज प्रतियोगिता, हिन्दी वाद विवाद प्रतियोगिता, हिन्दी तकनीकी लिखित प्रतियोगिता एवं हिन्दी दमशराज प्रतियोगिता का आयोजन किया गया। हिन्दी पखवाड़ा आयोजन समिति की अध्यक्षता डा. नीता खांडेकर की अगुवाई में समिति के सदस्यों डा. बिक्रम ज्योति, डा. हर्षा वाकुडकर, श्री राजेश तिवारी, सहायक मुख्य तकनीकी अधिकारी, श्रीमती दीपिका शेन्डे, सहायक मुख्य तकनीकी अधिकारी तथा सदस्य सचिव श्री राकेश कुमार, उप निदेशक ने हिन्दी पखवाड़ा की विभिन्न गतिविधियों तथा प्रतियोगिताओं का सफलतापूर्वक आयोजन कराने में महत्वपूर्ण भूमिका का निर्वहन किया।

संस्थान के निदेशक डा. सी. आर. मेहता की अध्यक्षता तथा प्रोफेसर सी.सी. त्रिपाठी निदेशक, एनआईटीटीटीआर, भोपाल के मुख्य आतिथ्य में दिनांक 03.10.2024 को संस्थान के रजत जयंती सभागार में राजभाषा पुरस्कार वितरण समारोह आयोजन किया गया जिसमें पखवाड़े के दौरान आयोजित की गई प्रतियोगिताओं के विजेताओं को प्रमाणपत्र से सम्मानित कर सरकारी कामकाज में हिन्दी के प्रयोग, प्रचार, प्रसार एवं कार्यान्वयन के लिए प्रोत्साहित किया गया।



### Swachhata Hi Sewa Pakhwada

Swachhata Hi Sewa campaign was observed in ICAR-CIAE, Bhopal and its Regional Station at Coimbatore during September 17-October 2, 2024. The theme of this year 'Swachhata Hi Sewa' was Swabhav Swachhata and Sanskar Swachhata. To begin with, banner on Swachhata Hi Sewa was displayed at three prominent places of the institute and Swachhata pledge was taken online under the Chairmanship of the Director General, ICAR New Delhi at 10:00 AM. Almost all categories of staff including KVK participated in the event.

Various activities including Ek Ped Maa Ke Naam plantation drives, cyclathons, Swachhata Quizzes at Schools, street plays, decorative murals, human chain, cleanliness drives, identification of black spots, preventive health check-ups, distribution of PPE Kits, safai mitra samman etc. were conducted during the fortnight.



### Independence Day Celebration

Independence Day was celebrated at the Institute on August 15, 2024. Dr CR Mehta, Director addressed the staff and emphasized the significance of independence, reflecting on the sacrifices made by freedom fighters. He highlighted the role of agricultural engineering in nation-building and the contributions of CIAE in this regard. The celebration continued with cultural performances and patriotic songs, fostering a sense of national pride and unity among the CIAE community.





PERSONNEL NEWS

OUR NEW COLLEAGUES



**Parikshit Meena**  
Assistant  
02.09.2024



**Sachin**  
Assistant  
02.09.2024



**Ajay Kumar Meena**  
Assistant  
04.09.2024



**Nikhil Panti**  
Assistant  
10.09.2024



**Abhishek**  
Assistant  
12.09.2024



**Ashutosh Awasthi**  
Assistant  
12.09.2024



**Ashutosh Kumar**  
Assistant  
18.09.2024



**Raj Kumar**  
Assistant  
24.09.2024



**Shreya Nayak**  
Assistant  
27.09.2024

Staff Promoted



**Shri RK Hedau**  
AAO  
wef 1 July, 2024



**Shri SK Parewa**  
UDC  
wef 1 July, 2024



**Shri Kumar Gaurav**  
AF&AO  
wef 22 August, 2024

Staff Relieved



Shri Pushendra Kumar, T-1 was relieved on 9 August, 2024 to join as Assistant Central Intelligence Officer, Intelligence Bureau, Ministry of Home Affairs.

**Chief Editor:** Dr. Sandip Mandal, Senior Scientist  
**Editors:** Dr. Adinath Kate, Dr. Ajesh Kumar, Dr. Abhishek Waghaye, Dr. Syed Imran and Dr. Bikram Jyoti  
**Word Processing:** K. Shankar  
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**Phone:** 91-755-2737191  
**Email:** director.ciae@icar.gov.in, directorciae@gmail.com  
**Web:** <https://ciae.icar.gov.in>